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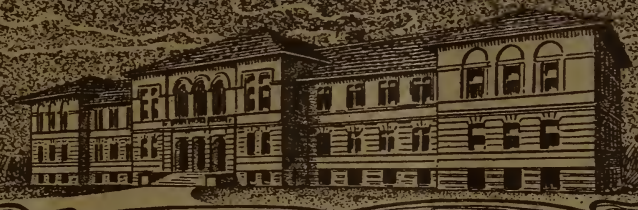
THE AGRICULTURAL STUDENT



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VOL. XIII. OHIO STATE UNIVERSITY, COLUMBUS, MAY, 1907 No. 8

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EDITORIAL NOTES

It now seems assured that the business managership of THE STUDENT will be controlled by the Agricultural Society in the future. As stated in the last issue of THE STUDENT, a new constitution was adopted by the Society and new officers, including the business manager, elected under this constitution. The constitution with a few minor exceptions was approved by Dean Price, representing the Agricultural College Faculty, and permission given the society to secure control of the business managership. Mr. J. C. White, the present manager, has agreed to turn the office over to the Society, and now the permission of the Publication Board of the University is all that is yet required; and there is no doubt that they will grant permission for the change.

The Society has felt for some time that with the paper entirely in their control, greater interest would be manifested in it by the student body in general, and a more valuable paper produced.

With this issue of THE STUDENT, the new editor assumes his duties. To his uninitiated mind these duties seemed

quite extensive, but the members of the staff have given such staunch assistance in the preparation of the paper that the editor has really had little to do. It is to be sincerely hoped that during the coming year, not only the newly appointed staff, but all students of the Agricultural College will co-operate with the editor in an effort to make THE STUDENT the best Agricultural College paper in the country. It is not enough that the paper should equal its former excellence, but it should continually improve and this is only possible with the hearty support of every student in the Agricultural College.

The Agricultural Society is an organization that every student of the Agricultural College should belong to and attend regularly. It is essential that there should be one organization in our college, where all may meet together and discuss affairs relating to the student body, and also for discussion of agricultural topics in general. Such meetings would foster loyalty and enthusiasm, and promote closer fellowship among the men. The Agricultural Society was organized for just this purpose. It is for the freshmen, the sophomore, the junior and the senior; for fraternity men and non-fraternity men, in fact for every student of our college, regardless of other affiliations. It is a great opportunity for the present members of the society to do a much needed work by getting every student in its membership this coming year.

Draft Horse Parade

One of the most interesting features this spring, in Columbus, to the lover of horses will be the Draft Horse Parade, June 5. For several years a parade of draft horses in their work-a-day form, has attracted quite a good deal of interest in the East, especially at Boston. Recognizing the value of such a parade here Prof. Plumb took up the matter with the business men of the city. The idea met with popular favor and at a meeting the first of April, the preliminary steps were taken towards having the parade.

At present over forty business firms have signified their intention to enter the parade. There is no doubt that there will be quite a large turn out, which will not only make it an interesting, but an instructive show.

The Agricultural Banquet

The Agricultural College at Ohio State has adopted a custom, which has been a strong factor in the social life at many of the leading agricultural colleges of the country. It is that of giving an annual banquet which is attended by all the students and members of the faculty of the College of Agriculture.

This initial banquet took place on the twenty-seventh of April, and was pronounced a great success by all those who attended. The number present exceeding even the brightest expectations and included some of the most prominent agricultural men of the state. The bountiful repast was thoroughly enjoyed and the toasts which followed were appropriate and well received.

Those responding to toast were: Pres. W. O. Thompson, My Farm; J. O. Williams, Make Hay While the Sun Shines; Prof. W. R. Lazenby, The Past; Howard Gelaugh, The Present; Prof. Alfred Vivian, A Little Nonsense now and then is Relished by the Best of Men; T. P. White, The Future; C. S. Plumb, Our Progress; J. E. Boltz, A Freshman; M. E. Corotis, The Banquet; Prof. H. C. Price presided as toastmaster.

Second Agricultural Special

The Agricultural Special Train that was run with such apparent success over the Cincinnati Northern R. R., at Christmas time, was again brought into service April 2 to 6 inclusive. During the first two days the route was over the B. & O. S. W. R. R. from Columbus to Blanchester and then eastward to Chillicothe. April 4, 5 and 6 was spent on the Pennsylvania lines, the route being from Columbus to Morrow, return to Xenia, westward to New Paris, and return to Columbus via the Indianapolis Division.

One of the Agricultural papers has very appropriately referred to this trip as "Institutes on Wheels." The institutes were of 45 minutes duration, and the subjects discussed were corn and alfalfa, one car being reserved for each subject. Evening meetings, for which halls were provided, were held at Blanchester, Xenia and Piqua. The trip as first planned included a Fruit and Forestry Special from Chillicothe eastward on the B. & O. S. W. R. R., but this had to be postponed until autumn owing to the damage done to the roadbed by flood.

Stops were made in sixteen different counties and over 4,000 farmers attended the meetings. The speakers were listened to with great attention, and appreciation of the work being done was frequently and freely expressed. Without doubt a good many people have been given a closer acquaintance with the Agricultural College and Experiment Station, and the seed thus sown will in time bear fruit.

The freight departments of the different railroads deserve praise for making this trip possible. Much credit for its success is also due to the agricultural press and the Ohio Grain Dealers' Association; both were active in advertising and arranging for the train. President Mayers, of the latter association, was a member of the party.

The speakers from the Experiment Station were Messrs. C. G. Williams and C. H. Kyle of the Department of Agronomy, and from the Agricultural College, Dean Price and Professors McCall and Foord.

Mr. Chas. McIntyre of the Farmers' Institute force and E. H. Culver, Chief Inspector of grain at Toledo, also added much to the interest of the meetings.

J. A. F.

The Columbus Horse Sale Co., held their inaugural combination sale at Columbus, Ohio, March 26 to 30, in the horse pavilion at the State Fair Grounds. Consignments of 600 horses of all classes came from breeders all over the state. The attendance was good and there were plenty of buyers for all the good stock. Draft geldings and market horses sold up to $300 and $400, and pairs at $750 and $720. Among the consignors of high grade stock were Col C. W. Crawford, Newark, Ohio, and The Hartman Stock Farm. The next sale will be May 21 to 24.

The graduates of the College of Agriculture and Domestic Science this year number twenty-two. The names of the graduates are as follows: Howard J. Campbell, Thesis: Origin and Development of Rambouillet Sheep; George Arthur Crabb—Porter Elliot, Joint Thesis: The Efficiency of the Gas Engine as a Farm Power; William Joseph Davis, Thesis: The Availibility of the Nitrogen in Mixed Fertilizers on the Ohio Market; Lawrence Halle Fox, Thesis: A Nine Month's Record of a Herd; Homer Carlton George, Thesis: Indications of Heredity in the Maize Plant as Shown

by the Reproduced Characteristics of the Parent Ears; Henry Clifford Green, Thesis: A Study of the Purity and Vitality of Some Commercial Farm and Garden Seeds; Thomas Frederick Hamilton, Thesis: The Construction of Posts from Cement Concrete; Frank D. Heckathorn, Thesis: The History and Development of the Duroc Jersey Breed of Swine; George Robert Hyslop, Thesis: The Influence of Soil Texture on the Rate of Solution; Erasmus Jones Kitchen, Thesis: Sheep Feeding as a Business Industry in Ohio; Carlton Johnson Koontz, Thesis: The Chemical Composition of Corn and its Effect on Germination; Maurice Ellsworth Laird, Thesis: The Origin and Development of the French Coach Horse, and his Influence on American Coach Stock; Ira Guy McBeth, Thesis: Soil Survey, of Pleasant Township, Brown County, Ohio; John Chester McNutt, Thesis: A Comparative Study of the Efficiency of the Pure Bred Jersey Cow in Milk and Butter Fat Production during a One Year's Test; Edward Jacob Petry, Thesis: A Soil Survey of Wayne Township, Noble Co., Ohio; Sylvan Henry Shawhan, Thesis: The Influence of Tankage and Similar Substances on Pork Production; Richmond Lee Shields, Thesis: The Field Liburnia and its Allies; Thomas Pursell White, Thesis: The Chemical Products Produced by Certain Bacteria in Milk. The following two men will graduate from the Horticulture and Forestry course: John Nisholas Frank, Thesis: An Examination of the Forest Conditions of the Woods on the Ohio State University Campus; Orma Jacob Burrell Smith, Thesis: Commercial Apple Growing in Ohio. The Domestic Science Department has but one graduate. Eva Hayford Pinkham, whose Thesis is: The Evolution of Textiles. William Henry Palmer, B. Sc., will take his Master's degree, Thesis: The Origin and Development of Aberdeen-Angus Cattle. James Chalmers White, B. Sc., also takes his Master's degree, Thesis: Factors Affecting the Germination of Seed Corn.

News Items

Prof. Harry Haywood, director of the Delaware agricultural experiment station and in charge of the agricultural work at Delaware State College, visited the University on Wednesday and Thursday April 17 and 18. He was accompanied by Messrs. Derby and Messick, trustees of the Delaware college and experiment station. They made a careful inspection of the agricultural department of Ohio State University especially the live stock equipment, in which Prof. Haywood was especially interested. He commented most favorably upon the character and condition of the stock.

Ohio State is one of a number of colleges which Prof. Haywood and his associates are visiting and inspecting the equipment. They are going to erect new buildings at the Delaware College and desire to first see the plans and equipment of other universities before deciding upon their plans. Prof. Haywood was a student in the Graduate School which was in session at O. S. U. in 1902.

George A. Crabb, a member of this year's class has accepted a position in the Soils Department at Washington. He reports that he is much pleased with his work and thinks Washington a model city. It is probable that Mr. Crabb will return to take his degree in June, as he has sufficient credit to entitle him to graduation.

Mr. J. C. White, business manager of THE STUDENT, a member of last year's

graduating class, and who has been working for his Master's degree this year, recieved a position as assistant agricultural editor of the Farm and Fireside, published at Springfield, Ohio.

Mr. White left to assume his duties shortly after the beginning of this term. He has the best wishes of his many friends for success in this work.

The library has just recently secured through the department of animal husbandry a complete set of twenty-three volumes of the Dominion Shorthorn Herd Book. This makes a valuable addition to the reference material already in the animal husbandry department. Perhaps no other agricultural college in the country has such a complete collection of herd books as Ohio State, and certainly it is second to none. This collection has largely been secured through the efforts of Prof. Plumb, who is untiring in his efforts to make the Animal Husbandry Department up to date in every respect.

The Department of Animal Husbandry has just completed for the Jamestown Exposition a collection of about one hundred varieties of wool. These represent samples from the sheep of the university, from various parts of the United States and Australia, and also show the commercial market classification of Boston, the leading American wool market.

Clay Robinson and Company have recently presented the Animal Husbandry Department with a large picture of a car load of angus steers which topped the market in Chicago at $17 per cwt. This is the highest price ever obtained in this market far a car load lot. Funk Bros., of Bloomington, Ill., were the consigners.

The Delta Theta Sigma fraternity has installed a chapter at the Ames College, Iowa. S. Kerr, from the O. S. U. chapter, went out during the spring vacation to install it.

E. J. Kitchen having completed his work is not in school this term, but is managing his farm near Springfield, O. He will be on hand, however, to take his degree in June.

F. D. Heckathorn has also completed his work, and is not registered this term. Commencement week will, however, bring him back again.

Dean Price and Prof. Lazenby have been appointed to represent the University at the celebration of the fiftieth anniversary of the founding of the Michigan Agricultural College, which is to be held the last week in May at Lansing, Mich.

Some much needed instruments have just been purchased for the use of students in the department of forestry. They were obtained from the Keuffel & Esser Co., of New York City. This department has also received a collection of seedling trees and rooted cuttings from E. E. Bogue, '88, professor of forestry in the Michigan Agricultural College.

J. A. Chenoweth, one of the enthusiastic students in agriculture, was obliged to leave the University at the close of last term in order to take charge of the home farm, near Greenville. He has purchased twenty colonies of bees and expects to make bee keeping one of the important features of his work.

M. E. Corotis, '08, of the department

of horticulture and forestry, has been appointed assistant in the department for next year.

J. N. Frank, a senior, who is specializing in forestry, received the honor of an election to the society of Sigma Xi. W. J. Davis, another senior in the College of Agriculture, received the same honor.

Alumni and Ex-Student News

William H. Pew, ex-'07, who has been attending the Iowa Agricultural College for the past two years, has been selected for Professor of Animal Husbandry by the New Hampshire Agricultural College. Mr. Pew has made a great record in this line of work while at Iowa and his appointment for this important position is the result.

William E. Evans, '06, is in the employ of the chief orchard inspector of Ohio.

A. H. Snyder, '01, has charge of the soil work in the agricultural extension department of Iowa Agricultural College at Ames. He is working under the direction of Prof. Holden.

James L. Edmonds, ex-'07, has a good position on the Sewickley Stock Farm in Pennsylvania.

C. L. Miner, '06, who is now one of the directors of a large ranch in Mexico, has written a very interesting letter regarding his experiences.

He is especially interested in raising alfalfa and in planting quick growing timber tres that will make fence posts. His address is Estacion Filipinas, Coahuilo, Mexico.

Charles A. Miner, '05, is now collecting forest tree seeds for the United States Bureau of Forestry in the Sierra region of California. In this work he will have an opportunity to study lumbering operations on a large scale and enjoy some of the finest scenery in the world.

Edward L. Shaw, B. Sc., '02, assistant professor of agricultural at the New Hampshire College, Durham, N. H., has recently been appointed Assistant in Animal Husbandry, to have charge of the work on sheep and goats in the Bureau of Animal Industry, Washington, D. C. Professor Shaw will take up his new position July 1.

W. G. Harry, who was in school in 1896-97, is in business in Germantown, British Guiana. His firm is engaged in engineering business and importing, and besides is very largely interested in rice growing and rice milling. Mr. Harry expects to visit O. S. U. sometime in June and perhaps attend the commencement.

Lon Parker, who graduated from the dairy department this year is conducting a test of 20 Holstein-Friesians, for advance registry, on the Thompson farm at Minneapolis.

W. H. Dilatush, ex-'08, expects to be in school next year. He has been farming for the past year and declares farming to be the most interesting occupation on earth.

Society News

Townsend Literary Society met Friday evening, April 5, and elected the following officers for the spring term: Pres., E. J. Petry; Vice Pres., M. E. Corotis; Treas., J .H. Cox; Sec., S. C. Hartman; Critic, M. F. Bartter; Sergeant-at-arms, C. E. Haven.

At the meeting of the Horticulture and Forestry club, Monday, April 8, the following officers were elected for the spring term: Pres., Arthur H. McCray; Vice Pres., Wm. G. Yeager; Sec.-Treas., Harold E. Barber. An interesting series of meetings is expected for the spring term, and every one interested is cordially invited to be present at the meetings. Join the club and take part in the discussions.

The Agricultural club at its April meeting enjoyed a talk by Mr. David Fyffe. He described agricultural methods and conditions in Scotland, his native country and wound up by inviting questions. The boys were not slow in asking them, and many interesting facts were given by Mr. Fyffe. Talks by such a practical and experienced a man as Mr. Fyffe, are very valuable to the students, especially those interested in animal husbandry, and every man there was well repaid for the time spent.

Echoes from the Banquet

Prof. Decker was speeding by in his automobile. Honk! Honk! went the horn. "Gosh!" said one student, "that man Decker must be burning money, sporting around this way in his automobile." "Yes," answered another, "and from the way it smells it must be tainted money."

Mr. Guthrie's lady friend was recently visiting at the University, and Mr. Guthrie was eager that she should see all the sights at the great school. Among the places inspected was the dairy barn, with the long row of cattle standing close to one another. "Oh, Mr. Guthrie!" cried the young lady, "why do they put the cows so close together?" and then added quickly: "Oh, I know. It's because they want to get condensed milk."

Dean Price is very much interested in raising goats on his farm over in Licking county. He has some animals which he is very proud of, and last fall decided to exhibit at the fair. So he took his choicest animals over, and when he arrived the manager of the exhibits informed him that they gave no premiums on goats. "Why, I think so," Mr. Price insisted. "No, you are mistaken," said the manager. "Why, I saw it in your catalogue," again insisted Mr. Price, and turning to a place in the book he triumphantly read, "Prizes will be offered for the best butter."

Dr. Gay (in the animal husbandry class): "Mr. Jones, how would you tell an aged turkey?"

Mr. Jones: "By the teeth."

Dr. Gay: "But the turkey has no teeth."

Mr. Jones: "No, but I have."

Prof. Lazenby had been away from Columbus for a long time. One day he drifted back and came out of the Union Station to catch a High street car. He saw one standing on the track, but, thinking it was not going immediately, gazed around. When he looked again the car was gone. "Well, I declare!" the professor exclaimed, "I didn't see them hitch the horses to that car!" Can you see the joke?

Bacteriology in Some of its Relations to Agriculture

The purpose of this article is not to discuss in detail any one phase of this subject but rather to call attention to the many ways in which bacteriology is related to agriculture and if possible give some idea of the importance of these minute plants in everyday affairs on the farm.

The knowledge of bacteria dates back to 1695 when they were first seen by Leeunwenhoek, the Dutch microcopist. About the middle of the nineteenth century there was begun a classification of these so-called animalculae; since then there has been rapid increase along this line but as yet knowledge is very incomplete and much work is being done.

Bacteriology is a comparatively new science but agricultural bacteriology is indeed one of the newest sciences if indeed it can be called a separate science at all. The earliest investigations were all concerning disease producing germs, so that even yet in the minds of many the word bacteria is almost synonymous with disease. This is very far from being true since only a very few are injurious and a much greater number are useful or so far as is known of neither harmful nor beneficial importance.

Since the disease producing organisms were first investigated they were the first of any importance in agriculture to be worked out. While a great deal of work has been done along this line there no doubt remains much more to be done. Among the diseases which are certainly attributed to bacteria and which are of importance in agriculture, are tuberculosis, anthrax, glanders, hog cholera and tetanus.

Besides a large number of bacterial diseases in animals there are also many plant diseases attributable to these micro-organisms. Among these are pear blight; tomato wilt, pear and apple twig blight, black rot of the cabbage, and curcurbit wilt. These diseases cause a large annual loss and as yet there is no effectual remedy.

Another group which plays a very important part in the economy of the earth is the class which decompose organic material; these are not all one kind but while varying much in form they all assist in returning the elements to their original form.

The importance of this can be realized if we could but imagine the state of affairs in case all the organic material which ever existed were now lying upon the earth's surface. We can easily see that there would be no place for the living in this vast heap of dead.

Another group which is of almsot incalculable value to the farmer, is that group known as nitrifying which changes organic nitrogen into a form available to the plant. Along with these nitrifying which are so useful there exists others which convert nitrogenous bodies into free nitrogen thus rendering this valuable element of no use to the plant. This well serves to illustrate the great importance of some knowledge of these plants in order to so manage manures and soils as to hold the nitrogen once fixed from the air.

Within the last few years much has been written concerning the bacteria which add nitrogen to the soil and indeed their importance can hardly be too highly estimated. There are two kinds of importance, one living with the legumes as symbionts, and the other living free in the soil. As to the relative importance of these two classes there has been much discussion, and no very definite conclusions have been reached. An attempt was made to use pure cultures

of nitrogen gathering bacteria in the hope that this might prove a cheap and easy source of nitrogen for plant food. Results have been very contradictory and as yet we cannot inoculate the soil and supply the nitrogen necessary for plant growth.

Perhaps in no other part of agriculture do bacteria play a more important part than in the dairy industry, for in this they are both harmful and helpful. Milk is secreted in a perfectly sterile condition but being an ideal medium for bacteria it soon has a veery high content unless great care is taken to keep everything sanitary. While it is necessary to keep the milk sold as food free from germs it is equally important to have lactic acid producing organisms in cream in order to make good butter. It is only within recent years that pure cultures have been used for this purpose but now their use seems to be on the increase. As to the exact part which bacteria play in the curing of cheese there is some discussion but they do play a part.

There are several other processes in which bacteria are important but which have not been fully worked out such as in making silage and curing tobacco.

O. M. JOHNSON.

Dwarf Fruit Trees

The practical ideas which permeate our American civilization are not confined to the business role of our lives. We have a tendency in all things to say "will it pay," that is, weigh it in the balance to see if it will "make bread." Until we get away from that idea we cannot develop our esthetic and enjoy the beauties of the fine arts, which like the qualities of a man cannot be measured in dollars and cents.

In treating the dwarf fruit trees the first question which would be asked by many would contain the setiment of the above and say "will they pay." Possibly they will and possibly not but we will try and look at them from the standpoint of the homelover and landscape gardner.

The dwarf fruit tree in question is a tree which is made so by artificial means. The means which are used for this purpose are:

1. Propogation on dwarfing stocks.
2. Repressive pruning.
3. Training to some prescribed form.

The method most commonly used in the first mentioned, that of grafting on dwarf stock. The quince is a common example of dwarfing stock. As this tree is naturally a slower grower and smaller at maturity than the pear, if the latter is grafted on the quinced stock a smaller tree will be obtained. The Paradise apple and sand cherry are other varieties of stock which are used in dwarfing fruit trees.

Dwarfing in this way does not effect the other characteristics of the fruit. In fact it has some decided advantages which will be mentioned.

Early bearing is quite an advantage to many persons. Some apples which require six to ten years to come into bearing will produce fruit in two years. It has been said that such trees would serve octogenarians, consumptives and those sentenced to be hanged.

But the class to whom they are a blessing is the large class who are not permanently located in business, or renters. If they do not expect to remain in a place more than five years they can plant dwarf fruit trees with a reasonable surety that they will enjoy t he fruit.

On small premises the small size of the dwarf trees are more in harmony with the surroundings and are easily

kept shaped up and free from insect pests. The increased number which can be planted on a limited area is certainly worthy of commendation.

The landscape gardener is now using this type of tree for ornamental planting especially about suburban places. The methods of training and arranging them is the winning point. In this they combine beauty with usefulness. So many are now obtaining small tracts just outside cities that it bids fair for the dwarf fruit trees with this class.

It certainly is quite novel to think of a dwarf hedge trained along a few wires and this hedge bearing a highly flavored and fancy apple, pear or plum.

The two forms recommended by nurserymen as most practical are the pyramid or the vase or bush form. The pyramid tree has simply a straight central stem with branches radiating from this. The bush or vase form has several arms or branches starting out from the same point, growing upright at more or less acute angles thus producing a rough vase shape.

These simpler forms are the better although many fancy designs are made by special training and pruning. Various forms of espaliers and fan shaped trees are used to good advantage. The U form consists of two upright branches joined to a single trunk below by an arc of a circle. The fruit being borne on the two parallel stems. This form is employed mostly for plums, apricots, peaches and nectarines.

The U form and double U form are used in training the trees against a dwelling. In the neighborhood of Paris walls are built just to accomodate the trees and both sides of the wall are used. It is reputed that hundreds of miles of these walls are used in France. Little of this elaborate designing is practiced in America but it is quite an old custom in Europe. There figures of birds, dogs, initials, etc., are often attempted.

The method of cultivation is much the same as for any garden crop. No attempt is made at growing them in sod. This reference to garden culture means quite intensive methods, great attention to details, good feeding and good spraying. In fertilizing care should be taken not to give more than is just enough for a healthy growth or the tree will not be dwarfed.

Some men are making a financial success in growing dwarf pears. Near Rochester, N. Y., an orchard of 3500 Dwarf Duchess netted the owner $3,182 in one season. Another grower reports that from an orchard of four and one-half acres of Dwarf Duchess he gathered 441 barrels of first class fruit which he sold for $1906. A grocer near Boston planted 500 dwarf pears. They commenced bearing in three years and have borne regularly ever since. His account shows sales averaging $500 an acre for each season.

A few varieties that are recommended are the Bartlett, Seckel, Winter Nelis, Duchesse, Clairgeau, Clapps Favorite, Flemish Beauty, Laurence and Sheldon.

JOS. H. GOURLEY.

Some Phases of Soil Investigation

The value of an experiment station to a state is proportionate to its ability to solve the various problems with which the farmer has to contend and present solutions to the agricultural classes. In every state variation in conditions prevent the development of this ability to a large extent. Variation may occur in rainfall, temperature or soil conditions either chemical or physical, but variation in soil conditions in some cases occur so frequently and

"And bearing deep within their crimson hearts,
Faint dream-like echoes of a long ago."

with such irregularity that any problem that may have been worked out by the station for a certain soil might not prove to be the solution of the problem for a soil from another part of the state, county or township; while rainfall and temperature are relatively constant for certain regions and any work carried on under those conditions could be considered as applicable to a comparatively wide range of territory and usually within certain limits in the vicinity of where the work was carried on. Thus it is evident that the method of soil investigation that will benefit the farmer most is the one that is the most extensive and considers the largest percentage of the various soil conditions of the state.

In order to obtain a more complete knowledge of the soil conditions of the state and to bring the farmers of the state into closer contact with the work of the experiment station, the University of Illinois Agricultural Experiment Station is carrying on a very extensive series of soil investigations. The beginning of the work was a general soil survey of the state. The object of this was to obtain a general idea of the soil types of the state in order that the work which was to follow might be applicable to the largest area possible. Following this was the establishment of experiment fields in various parts of the state on the representative soil type of each region. Chemical and physical analyses of the soil of these fields are made and the results used for comparison with other samples taken from various parts of the state in connection with the detailed soil survey. The soil survey work is carried on in order that the station may come into closer contact with the soil problems of the state and to prepare a soil map which presents to the farmer the classification which the station makes of the soils with which he is familiar, thus making it less difficult for him to understand the literature published in regard to the results obtained on the experiment fields.

At present the station has about twenty experiment fields, which consist of from ten to twenty acres each. Experiments are carried on to solve the problems which are associated with the soil type on which the field is located. All the work of these fields is directly superintended by a member of the station staff. Two men spend their entire time in connection with this phase of the work.

One of the greatest problems is the treatment of the gray silt loam areas in the southern part of the state. This type occupies twenty-five or thirty counties in this part of the state. It occurs in two phases—the timbered phase, which is, or has been timbered, and the prairie phase, which has never had any timber on it. The former, when typical, is nearly pure white on the surface and a yellowish gray subsoil, which is usually slightly plastic. The prairie phase has a light coffee-colored surface and a very plastic impervious subsoil which is known locally as "hard-pan." In some cases this hard layer is found quite near to the surface. The application of phosphate rock in connection with green manure has proved to be quite satisfactory in most cases on this type, but the process of building up a farm on this type of soil will necessarily be a slow process.

In some of the northern counties of the state some very important work has been done on the reclamation of peaty swamp lands. These investigations have proven to be of immediate

value to the farmers of the vicinity. Some very marked results have been obtained by the addition of potassium, gypsum and lime.

In Johnson county, which is located in the extreme southern portion of the state, experiments are being carried on to determine the most efficient methods for preventing washing. The counties of this region are unglaciated and are quite broken in topography, thus making the washing of soils a very serious problem.

The work in the detailed soil survey consists mainly of preparing a map drawn to the scale of one inch to the mile, showing the soil types. While the soil types are necessarily quite broad in some cases, as a rule the various areas of any type are quite similar in their physical characteristics and usually chemical also. In determining a type the main factors taken into consideration are topography, physical properties, and productivity as evidenced by the growing crops.

Topography is quite important in determining a soil type because either now or at some remote period the topography has affected the way in which the soil has been formed, and in some cases the method of formation has determined the topography. It is an exception to find a soil type boundary which is not marked by a change in productivity, color, texture, or some other important feature.

In determining the physical properties of a soil it is examined to a depth of forty inches, the main features which are noted being texture, color, and structure of the soil and subsoil at various depths and their relation to each other. The physical properties are in reality the basis of classification, but they are modified quite appreciably by topography, and the productivity, while it indicates the chemical properties of the soil is also influenced by its physical properties.

In considering the productivity of a soil in determining a soil type a general standard which represents each soil type is kept in mind and the soil in question referred to that standard in a general way. It is evident that no distinct boundaries could be made from productiveness alone, but in some cases it is the main factor in separating types in a general way.

When the soil map of a county is completed samples of the various types are taken and chemical and mechanical analyses made. These results are then compared with the analyses of the soils of the experiment fields and published in a bulletin of the station.

While the party is in the field notes are taken which explain various peculiarities which cannot be shown on the map. Before leaving a county each party submits a report consisting of a description of each soil type, agricultural conditions and practices, geology and physiography of the county and any other items of interest to the farmer, or which would aid in the work of the experiment station. When a bulletin is published reporting this work all these things will be considered and published in a concentrated form.

The experiment station has been carrying on the soil survey work independently for three seasons. Previous to that some work was done in co-operation with the Bureau of Soils, U. S. Department of Agriculture. Twenty counties which comprise over one-fifth of the state have been completed. From eight to twelve men are kept in the field eight months of the year. One party works in the northern part of the state and two in the southern. A party usually consists of four men, but in

some cases two make up a party. During the past summer seven counties have been surveyed, covering an area of over 3,800 square miles. The work outlined for next season when completed will be so distributed over the state that every county in the state that remains unsurveyed will be adjacent to a surveyed county, making the work very widely distributed.

R. C. Doneghue, '06.

Tea Growing in the United States

At the present time there are two tea plantations in the United States, both in South Carolina. One is located at Summerville about 21 miles north of Charleston, and is owned by Dr. Charles U. Shepard, who may be called the father of tea growing in America. He was not the first to grow tea in this country but he is the man who has succeeded in growing it on a commercial scale. At present Dr. Shepard's "Pinehurst" Gardens contain in the neighborhood of one hundred acres of tea. The other tea plantation is at Tea, South Carolina, 20 miles south of Charleston. This place has been in operation for about 6 years and now there is about 125 acres of tea planted out. Some of this is beraing good crops at present but a large part of it is one, two and three years old. This plantation is owned and operated by the American Tea Growing company.

During the past year it was the writer's good fortune to live on the plantation at Tea, S. C., and also to make several visits to Dr. Shepard's Gardens at Summerville. At these two places all the processes of tea growing and its manufacture were carried on.

The idea of growing tea in the United States did not originate with Dr. Shepard. In 1800 the first tea set out in America was done by the French botanist Michaux on the Ashley River about 15 miles from Charleston, S. C. From that time on tea was grown in different parts of the south, but only in small quantities, as a novelty. In 1858 the commissioner of patents ordered 10,000 plants from China and had them distributed in South Carolina and other southern states. Prior to the Civil War many families in South Carolina grew tea for their own use, but not until 1881 was there an attempt made to grow tea on a scale large enough to give any decisive results. This attempt was made by the United States government near the present Pinehurst Tea Gardens at Summerville. The project came to an untimely end without any notable results being achieved. In 1883 Commissioner of Agriculture, George B. Loving stated that "the climatic conditions are not favorable to it," and the garden was abandoned.

Dr. Shepard was not convinced that tea could not be grown in this country and he determined to give it another trial. About 1890 he set out an acre of tea and the fact that he has increased the acreage to 100 acres is sufficient evidence of his faith in the project. Up to the time that Dr. Shepard began work most of the experimenting had been to ascertain whether the plants would thrive or not, but he has carried it on through all the processes from growing the plants to selling the finishel product. Some of the processes of manufacture and some of the machinery used are the results of his mind.

The difficulties in replacing imported teas by American product is first in growing the leaf; second the increased cost of labor in this country; third, the conversion of tea drinkers to the taste of a new sort of tea. The rainfall where tea is grown in other parts of the world

is from 60 to 150 inches per year and most of this during the season when the leaf is developing. In this country the rainfall during the growing is not more than 30 or 35 inches. The labor item is of great importance, but it has been hoped that a great deal of the expensive, hand labor can be done by machinery and a great deal has been done along that line already.

The tea plant is propagataed from seed and the seedlings set out when a year old or sometimes kept over for two years. The propagating bed is partially shaded by slats and is kept moist during the growing season. The seedlings are set out in the field from 4 to 6 feet apart each way, perferably the latter, and thorough cultivation is kept up during the growing season. At two years of age from transplanting they may be picked. A small crop will be secured for several years. In the winter the plants are pruned back to within a few inches of the previous year's growth. Leaf growth is stimulated by this pruning.

In picking, the tender leaves and the tip of the shoot are taken. The first picking should be in April and then about every two weeks until October. The pickers are paid by the pound at the rate of two cents, which is about eight times as much as it costs in China and India. At this price the pickers receive very small wages, but as it requires four pounds of green leaf to make one pound of the finished product the expense is considerable.

The difference in green and black teas is in the process of manufacture and not from different varieties as many people suppose. To make black tea the green leaf is spread out upon the floor or trays and allowed to wilt. The time required for the wilting depends on the temperature of the room. After wilting it is rolled until the leaves have a tight roll, as is seen in the cured tea. The leaf is taken from the roller and spread on the floor, and covered with a wet cloth to keep from drying out. A process of oxidation takes place at this juncture due to an enzyme present in the leaf and it is this oxidation that gives black tea its characteristic taste. After the material has turned a reddish brown it is dried in a "Tea Dryer," a special dryer for this purpose, at a temperature of about 200 degrees fahrenheit, until all moisture is removed. The dried leaf is then run through the chopper and sorter, where the various sizes are separated from each other and chopped to a uniform length. Sorting gives some of the different grades of tea, dependent on the size of the leaf and tip—the smaller, the higher and better the quality. Chopping is of no value except that a uniform product results.

Green tea is made in the same way except that the leaf is wilted in the "Rotary Wilter," (a machine invented by Dr. Shepard) at a temperature high enough to kill the organisms producing the reddish brown color of the black tea during fermentation. Herein lies the difference of manufacture of green and black teas—depending upon the wilting whether at a high heat or at room temperature.

The American tea has a flavor different from the imported teas and one has to be educated to the taste before he will use it. It is much cleaner than foreign teas, for it is not handled so much by the hand and because it is put up in dust proof boxes at the factory and they are not opened until reaching the consumer. The boxes range from one-eighth pound size to two pounds. Tablets are also put up, twenty in a box making many cups of tea. One tablet is

placed in a cup, hot water is poured on it and allowed to stand for a short time, when it is ready to drink.

H. C. THOMPSON.

National Food Law of U. S.

While the function of clothing has in part changed from that of protection to ornamentation, the function of food still remains as it was originally, that is to build up the body and furnish energy. The nature of a man's food determines in a large measure a man's career. Those people who have pure, well prepared food are more apt to be temperate and therefore more law abiding citizens than those who have impure and poorly prepared food.

Adulteration of food probably began almost as soon as foods began to be prepared outside of the homes. It is certain that our pioneer forefathers were not troubled greatly with adulterated food. When large cities appeared, large food manfacturing companies, which were run merely for profit, appeared. Now it is evident that if some worthless or very cheap substance could be substituted for the article of food without changing materially the color, order or taste of the product, the gain to the manufacturer would be much greater. This is what actually occurred. In some cases substitutes were of the most ingenious sort and contained none of the substance under the name it was sold. In one case it is reported, that tapioca colored with lamp black was sold for pepper. The fact that food and drugs were being adulterated has long been recognized by nearly every state in the Union, and each state has its pure food laws. Many attempts have been made to pass a pure food bill through the National Congress but without success, until June 30, 1906.

This law dealt mainly with interstate commerce. The local druggist or grocer can adulterate his wares and not come within the jurisdiction of this law, but if he sends the adulterated article into another state he is liable to prosecution under the national law.

Drugs are considered adulterated when they have not the standard strength as set for by the United States Pharmacopacia, unless otherwise specified on the package. Confections are considered adulterated if they contain mineral coloring matter such as chrome yellow, barytes, etc., or any alcoholic liquor or narcotics. Foods are considered adulterated if they are mixed with any substance which will reduce or injuriously affect its strength and food value, if a substance is substituted, wholly or in part, for the article, or if any valuable constituent has been wholly or in part extracted.

The law places the work of detection and prosecution for the violations in the hands of the secretary of the treasury, secretary of agriculture or secretary of commerce and labor. Each of the three secretaries appoint a member of a committee, which has direct charge of the work. Those acting at present are Jas. L. Gerry, representing the department of the treasury, Dr. Harvey W. Wiley, representing the department of agriculture, and S. N. D. North, representing the department of commerce and labor. When this bill was brought before congress it met great opposition. It is generally understood that a large amount of money was used in paying lobbyists who worked against the law. There were many large canning and packing companies who were opposed to the law because it seemed to affect their business very seriously. The people in general were in favor of the law be-

cause it made it possible for them to know what they were buying. The law also made it possible for them to ascertain the preservative used to preserve their food. While the law does not prevent inferior foods from being put on the market it does make the manufacturer correctly label the inferior article.

At first sight it seems that there would not be much for the committee to do but they have a most difficult task before them. They must decide what preservative may be used, and what may not, and many other details of the law have to be passed upon by the committee. The work is not nearly finished at this writing, but the work done so far goes to show that the committee is going to carry out the spirit of the law rather than the letter of the law.

B. M. HENDRIX.

The Work of the Economic Entomologist

While the farmer or horticulturist is busy at home planting, caring for and harvesting his crops there is an army of men continually working to help him make his work a financial success. Either in the employ of the government or in the role of private investigators they are at work in laboratory field or office seeking to discover better ways of growing crops, caring for them or protecting them, and giving the results of their work to those whom they will benefit. Surely the farmer is fortunate in having these men to look after his interests. In order to give an idea of what is being accomplished let us consider briefly the work of the economic entomologist.

Few appreciate the importance of insect destruction on production. Insects destroy cultivated plants, infest domestic animals, injure food and manufactured articles, and even molest or harm man himself.

When our country was new, with small tracts under cultivation and large areas of forest, insects did little harm. There were only native species then, and these found abundant food in the forest, and they also had natural enemies, which held them in check. With the cutting out of the woods, the cultivation of large areas in certain crops, and, finally, the introduction of new species of injurious insects, for which had developed no natural enemies, came an opportunity for the increase of injurious insects to an alarming extent. Now nearly every plant has an insect enemy, and frequently many—for instance, the maize plant has 200 species attacking it, clover 200, apple 400, and the oak probably 1000 species.

Folsom, in his work on entomology, gives the following interesting figures to illustrate insect depredation: The cotton worm caused a loss of $15,000,000 from 1860 to 1874; the Rocky Mountain locust, in the States of Iowa, Missouri, Kansas and Nebraska, caused a loss of $40,000,000 in 1874, and the total loss from this pest, 1874 to 1877, is estimated at $200,000,000. The loss through the chinch bug in 1864 was $73,000,000 in Illinois alone. It is impossible to estimate the tremendous losses due to the Hessian fly, fluted scale, San Jose scale and cotton boll wevil, but they run up into the hundreds of millions. In France for forty years the grape Phylloxera threatened a national calamity by exterminating the vine, and caused untold loss.

It is estimated that at least 10 per cent. of every crop is lost through the attacks of insects. Webster says: "It costs the American farmer more every year to feed his insect foes than it does to edu-

cate his children." The average annual damage done to crops by insects in the United States was conservatively estimated by Walsh and Riley to be $300,000,000; an estimate of loss by forest insect depredations is put at $100,000,000. The common schools of the country in 1892 cost the sum of $235,000,000, and higher institutions of learning less than $50,000,000, showing that Webster's statement is t rue.

Slingerland goes farther and says: "The yearly losses from insect ravages aggregate nearly twice as much as it costs to maintain our army and navy, more than twice the loss by fire, twice the capital invested in manufacturing agricultural implements, and nearly three times the estimated value of the products of all the fruit orchards, vineyards and small-fruit farms in the country."

This all gives us an idea of the great saving which a knowledge of how to intelligently fight and control these pests will bring about, and to the entomologist most of our thanks are due.

Massachusetts was the first State to officially apply the knowledge of the entomologist to the insect problems of its citizens. This was in 1837, and New York and Missouri followed soon after. Now many States have an entomological department in connection with their experiment stations.

The United States Entomological Commission was created in 1877 and its members instructed to study the then great insect problems and recommend methods of controlling the pests. Their first work was upon the Rocky Mountain locust and the cotton leaf worm. As a result of their labors it is said that in the case of the cotton worm the methods which they advocated have enabled the cotton farmer to practically control this insect, thus preventing a loss which was estimated at $30,000,000 per year.

The United States Bureau of Entomology has developed from this commission of three men and has at the present time a trained corps of fifty-five men, who are studying insect problems all over the country, from the boll wevil of the cotton growing districts to the gypsy moth of New England. It goes without saying that they are discovering methods which will save agriculturists millions of dollars every year.

One of the most serious pests of the century and one that has caused greater loss and promises to cause greater loss in the future than any other insect is the San Jose scale. It is an introduced species, thought to be from China. It was first discovered in the United States by Prof. Comstock in the San Jose valley, California, in 1880, and its serious nature realized. It had been a serious pest there since 1873. It rapidly spread over the Western States and in 1893 was discovered to be present in many places in the Eastern States. The Bureau of Entomology at once took up the problem and pointed out to the fruit growers the serious nature of the pest and so put him on his guard. They at the same time worked on remedies and encouraged State inspection of nursery stock. The sending out of infected nursery stock is the most effective method of spreading the insect. The States have nearly all taken this up, but unfortunately too late to prevent its being spread into many sections of the country. However, the Bureau of Entomology and the State entomologists are teaching the fruit growers how to check the insect and to prevent its further spread.

There are today forty-one States which have inspection laws which are intended

to prevent the spread of noxious insects, and many of them are spending much money in the work. Besides this, there are forty-one States employing in the experiment stations alone sixty-five men, who are studying insects with the one idea of finding means of control which the practical farmer may apply under his local conditions. These men are doing a work second only to the United States Bureau of Entomology, and in many instances their work is even more practical than that of the bureau.

Besides insects which damage our crops, insects which infest stock and cause disease among men are being studied. It is to the entomologist that the possibility of the eradication of yellow fever is due and incidentally the construction of the Panama canal.

A volume might be easily written about what the entomologist has done for the wellfare of the country, and yet not enough said. His work is only just begun and will go on increasing in value from year to year. E. K.

Classification of the Rose

As produced by the different nations, the French are in the lead, with the English a close second as producers of new roses.

The English and the American growers exercise more care and reliability in selecting roses than do the French. Among the many works published no two will be found agreeing exactly as to the different groups under which roses should be classed. The Encyclopedia of Horticulture is the best and most reliable work on the scientific classification, while for the gardener's classification, Elwanger's book on the rose cannot be excelled.

The Encyclopedia divides the rose into two classes, the first class, being the summer flowering roses, blooming once only, and the second class are the summer and autumn flowering roses, blooming more or less continuously. The first class is divided into the following groups:

1. Provence is fragrant, branching or pendulous, with flowers generally globular in form, the foliage is bold, broad wrinkled, deeply serrate and prickles uncertain, sometimes fine and straight or sometimes coarse and hooked. Will do well in a rich soil.

Prune closely unless the plant is very vigorous. Some of its types are Moss rose, a crested form of the Provence, and Pompon, a dwarf group having cupped flowers.

2. Damask and French roses are fragrant, growth is robust, the leaves are light green in color. They are hardy and free-flowering. The scent is destroyed on drying. Some types are Hybrid French or Hybrid Provence and Hybrid China.

The French roses are moderately fragrant and are more upright and compact in growth than the Provence. The prickles are smaller and fewer and the flowers are generally flat. Plants are very hardy, growing in any soil. The petals bleach in strong sunlight.

3. Alba or White Roses. A very distinct group, with flowers light-colored and of moderate size. The leaves are whitish above and deep green below. Some hybrids with other groups are very thorny. A few types are Filecite, Parmentier and Maidens Blush.

4. Ayrshire Climbing Roses. These are very hardy with slender shoots suitable for trellises and trunks of trees. The flowers are produced singly, and are useful for pot cultivation when trained over a frame. The flowers vary from white to deep crimson. Types are Queen of

the Belgians, Dundee, and Rambler. Ruga is a hybrid between this group and one of the Teas.

5. Briers. Under this heading may be grouped most of the well-defined types of garden roses. They are mostly small flowered and do not readily respond to high cultivation. They are more useful as flowering shrubs in the garden than for cut flowers. The blooms are generally short lived. Types are Austrian or Yellow Briers, Scotch or Spiny, Sweet Brier, Lord Puyance Briers, Prairie Rose and Alpine or Boursault.

6. Multiflora. This group *generally* divides itself naturally into the Multiflora true and Polyanthe. R. multiflora, the parent type, is characteristic of the varieties here, the flowers being produced in large corymbs continuing over a comparatively long time. This group is particularly well adapted to the wild garden. There are many hybrids which are known under the general term of Rambler Roses.

7. Evergreen. The so-called evergreen roses hold their foliage until very late in the year, and in hybridization appear likely to yield varieties which are practically evergreen. The following are types of this group: Sempervireus, Wichurciena and Bangsian.

8. Pompon is a small flowered provence rose.

Under class two are the following:

9. Hybrid Perpetual or Hybrid Remontant. A large and comprehensive group of much mixed origin. The mixture with other groups has become so involved as to render separation practically impossible.

10. Hybrid Teas form a section of the Hybrid Perpetual groups crossed back on to the Tea-scented China, gradually losing all identity.

11. Moss. A perpetual flowering group of the Provence.

12. Bourbon. Dwarf and compact growth, brilliant colors, and requires close pruning.

13. Bourbon Perpetual, very floriferous.

14. China types are Tea-scented China or Tea Rose and Laurenciana.

15. Musk, very fragrant. Noisette is one of its types.

16. Ayrshire, perpetual forms of the Ayrshire.

17. Polyanthe, perpetual flowering varieties of the multiflora group.

18. Perpetual Briers.

19. Evergreens Types, Macartuey and Wichuraiana.

Ellwanger in his book on the rose divides the families of roses in general cultivation into two parts. The first part consists of the summer roses, those which bloom but once during the season, in the months of June and July.

A further division is made into two classes, the first being the climbing or sarmintous roses. Under this head are various groups, the leading ones being as follows:

Ayrshire rose, of English origin.

Banksia rose, a native of China.

Boursault, which is a distant but worthless group.

The Evergreen rose has much in common with the Ayrshire, but has dark green foliage.

Hybrid climbing roses.

Many Flowered rose is a native of Japan.

Prairie rose is the most valuable of the non-remontant climbers.

Class two is divided into the following groups:

Austrian Brier, a native of the south of Europe.

Damask rose is found native about Damascus and various portions of Syria.

French rose, has not been traced to any country.

Moss rose, believed to be a sport from the Provence rose.

Provence rose is supposed to have been known to the Romans.

Sweet Brier is found growing wild in different countries, but the variety known as Common Sweet Brier, a native of England, is the only one worth growing.

Scotch rose is a native of England and Scotland.

Part two are the Perpetual or Autumnal roses, blooming more than once during the season, many of them continuously from June to November, or until cut off by the frost. This is divided into two classes, the first class being the Sarmentous, Climbing or Running Roses.

The following are the groups belonging to this class:

Hybrid Climbing roses, of modern origin and come from various sources.

Microphylla or Small-leaved rose is a native of China.

Noisette or Champorey rose is of American origin.

Polyantha Remontant rose was brought from Japan.

Climbing Tea rose is a division distinct from the other teas.

Class two, are antumnal non-climbers consisting of the following groups:

Bengal or China rose is a native of China.

Bourbon rose, obtained from the isle of Bombon.

Hybrid Noisette rose is comparatively a new group of considerable importance.

Hybrid Perpetual or Hybrid Remontant rose is by far the most valuable, if not the most beautiful of all the groups of roses.

Perpetual Moss rose has the same characteristics as the moss rose already described.

Tea rose, originally from China. Two of the varieties are the Black Tea and Yellow Tea.

M. E. COROTIS.